HOPE ELEMENTARY SCHOOL (PWSNO 1090185)
SOURCE WATER ASSESSMENT REPORT

August 5, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This risk assessment is based on a land use inventory in the well recharge zone, sensitivity factors associated with how the well was constructed, and aquifer characteristics.

This report, *Source Water Assessment for Hope Elementary School*, describes the public drinking water well; the well recharge zone and potential contaminant sites located inside the recharge zone boundaries. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for this public water system. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Hope Elementary School drinking water is supplied by a single well drawing from a small aquifer on the northern shore of Lake Pend Oreille near Hope, Idaho. The water system is owned by Pend Oreille School District 84 and serves a population of 175 students. A ground water susceptibility analysis conducted by DEQ May 15, 2002 ranked the well moderately susceptible to all classes of regulated contaminants. Risk factors related to local geology added the most points to the final susceptibility scores.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Operation and maintenance of the system is mostly in compliance with *Idaho Rules for Public Drinking Water Systems*. Eliminating possible cross connections and venting the well properly should be the first priority for protecting the school's water quality. The district should develop a water system emergency response plan. It might also be helpful to have a written maintenance and testing schedule so important tasks don't get overlooked. Because the well is located in the landscaped area right next to the school, the maintenance staff should be reminded periodically to keep application of fertilizers, pesticides and herbicides a minimum of 50 feet from the well.

Because the school district does not have direct jurisdiction over the entire recharge zone delineated for its well, it will be important to form partnerships with neighboring landowners, and local governmental agencies for ground water protection. As one of the key institutions in the community, the school is in a unique position to promote ground water stewardship. In addition to teaching school children, public education efforts can reach adults through programs sponsored by the parent association.

Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. For assistance in developing protection strategies, please contact the Coeur d'Alene Regional office of the Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR HOPE ELEMENTARY SCHOOL

Section 1. Introduction - Basis for Assessment

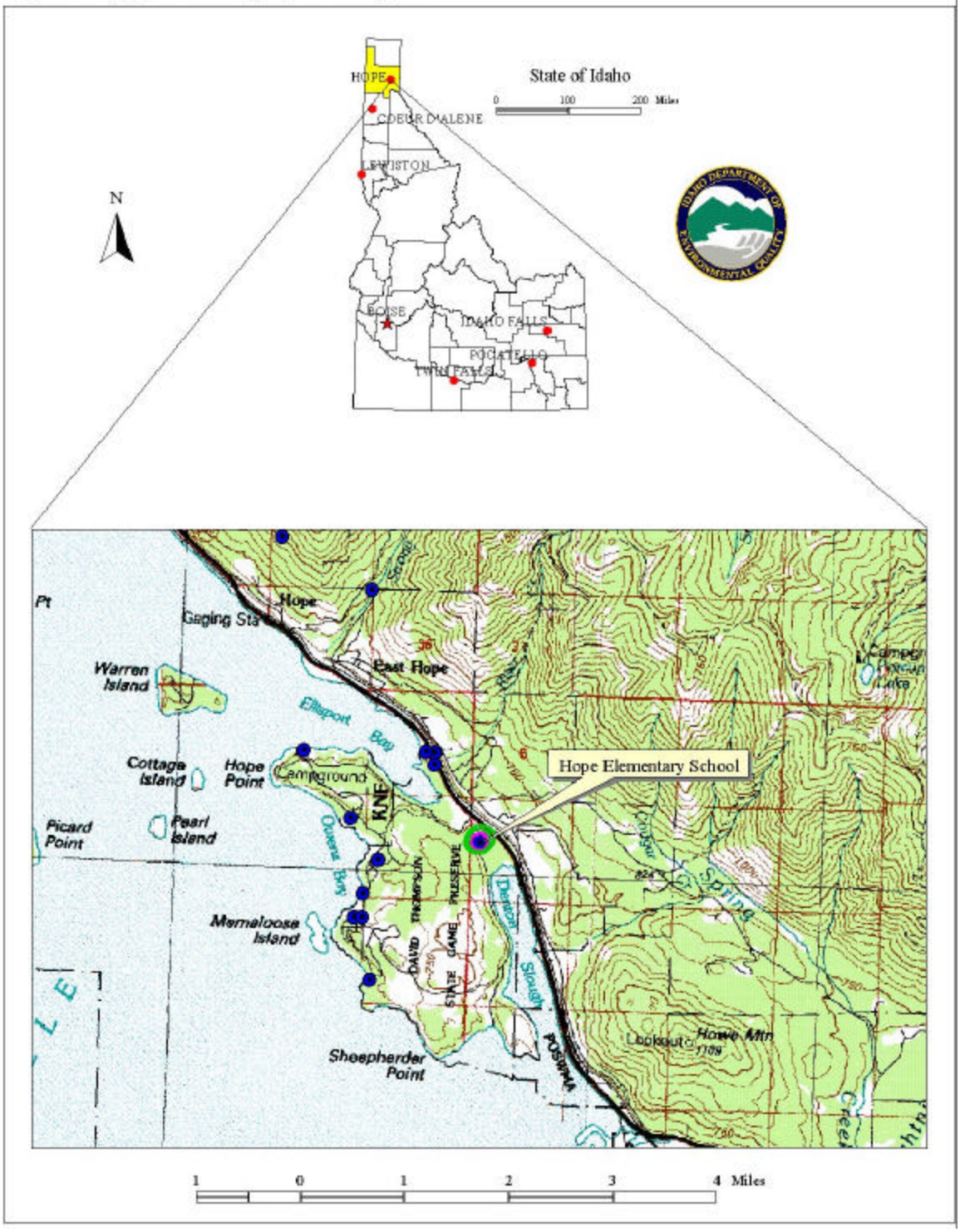
The following sections contain information necessary for understanding how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and an inventory of significant potential sources of contamination identified within that area are included. The ground water susceptibility analysis worksheets used to develop this assessment are attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public drinking water source in Idaho for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. These assessments are based on a land use inventory inside the delineated recharge zones, sensitivity factors associated with how the well is constructed, and aquifer characteristics. The state must complete more than 2900 assessments by May of 2003. Because resources and the time available to accomplish assessments are limited, an in-depth, site-specific investigation for every public water system is not possible.

The results of the source water assessment should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system. The ultimate goal of this assessment is to provide data to local communities for developing a protection strategy for their drinking water supply. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Geographic Location of Hope Elementary School



Section 2. Preparing for the Assessment

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the well recharge area into time of travel zones indicating the number of years necessary for a particle of water to reach a well. DEQ used a refined computer model approved by the EPA to determine the time of travel (TOT) for the water public water systems pump from the Hope aquifer. The computer model used data DEQ assimilated from a variety of sources including local well logs.

The Hope Elementary School water system serves a population of 175 students. The school is located on Peninsula Road just off of Highway 200 near Hope, Idaho (Figure 1). A single well supplies the school's drinking water and water for irrigation. The well is 130 feet deep and has a capacity of 75 gpm.

The well recharge zone delineated for the Hope Elementary School Well covers nearly 38 acres divided into 0-3, 3-6 and 6-10-year time of travel zones (Figure 2). The delineated area is roughly circular, with ground water flowing from the perimeter toward the well.

Identifying Potential Sources of Contamination

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Inventories for public water systems in Idaho were conducted in two-phases. The first phase involved identifying and documenting potential contaminant sources inside individual source water assessment areas through the use of computer databases and Geographic Information System maps developed by DEQ. The maps and inventory lists were then sent to system operators for verification and correction. Sid Rayfield, facilities director for Lake Pend Oreille School District #84, completed the enhanced inventory for Hope Elementary.

Figure 2, *Hope Elementary School Delineation and Potential Contaminant Inventory* on page 7 of this report shows the location of the Hope Elementary School well, the zone of contribution DEQ delineated for the well, and potential contaminant sites located in the vicinity. Land use inside the delineation boundaries is suburban. Small portions of the 3-6 and 6-10 year time of travel zones delineated for the well lie under the Ellisport Bay Sewer Board waste water land application site.

Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

Section 3. Susceptibility Analysis

The susceptibility to contamination of all groundwater sources in Idaho is being assessed on the following factors:

- physical integrity of the well,
- hydrologic characteristics,
- land use characteristics, and potentially significant contaminant sources
- historic water quality

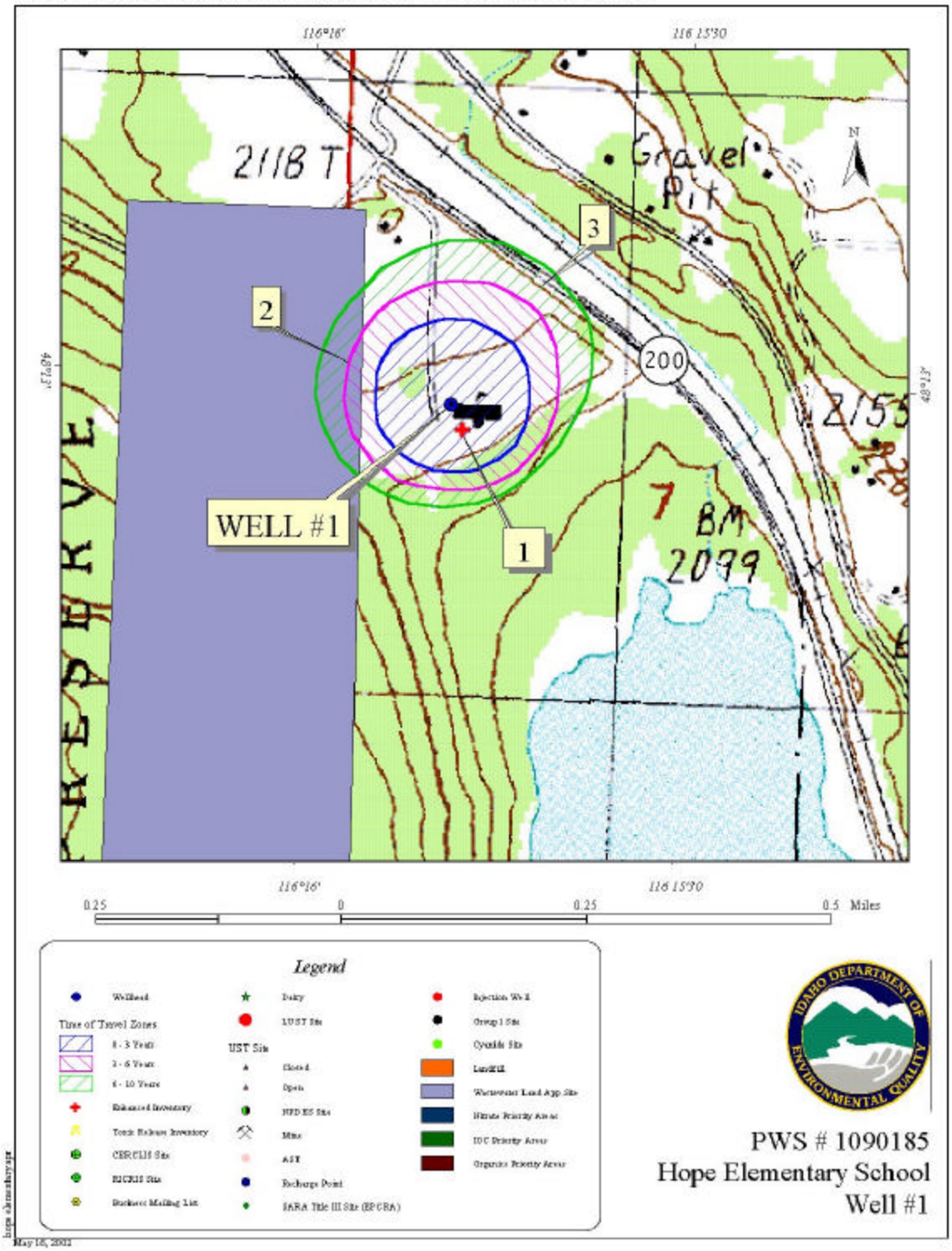
The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. A high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking. The Susceptibility Analysis Worksheet in Attachment A shows in detail how the Hope Elementary School well scored.

Well Construction

Construction methods directly affect the ability of a well to protect the aquifer from contaminants. Lower scores imply a well that can better protect the water. This portion of the susceptibility analysis relies on information from individual well logs and from the most recent sanitary survey of the public water system. The well log for Hope Elementary School is on file with DEQ. The last Sanitary Survey of the system was in September 1998. The survey noted that the well casing needed to be properly vented with the open end of the vent turned downward and screened.

The Hope Elementary School well was drilled in July 1987 to a depth of 132 feet. It is cased from 2.5 feet above ground to 117 feet below. A stainless steel well screen was set from 188 to 130 feet. The bentonite clay surface seal is 23 feet deep, terminating in a layer of clay and sand. The static water level is 91 feet below the surface. Except for a minor variation in the wall thickness for 8-inch steel casing, the well construction meets current Idaho Department of Water Resources standards.

Figure 2. Hope Elementary School Delineation and Potential Contaminant Inventory.



Hydrologic Sensitivity

The hydrologic sensitivity score for the Hope Elementary School well is 4 points out of 6 points possible. This score reflects natural geologic conditions in the recharge zone as a whole and at the well site. Information for this part of the analysis is derived from the soil classification inside the delineation boundaries and from the soil profile reported on the well log. Soils in the capture zone delineated for the Hope Elementary School well are generally moderately well drained. Poorly drained soils are deemed more protective of ground water than soils which drain faster.

The well log reports that the first water bearing stratum in the well is a layer of sand and gravel between 95 and 130 feet below the surface. Soils above the water table are a mixture of clay and coarse gravel, sand and cobbles. The clay does not form a thick, continuous lens that could act as a barrier to the vertical transport of contaminants.

Potential Contaminant Sources and Land Use

Land use inside the Hope Elementary School well recharge zone is suburban. Septic system components for the school are 100 to 200 feet south of the well. The 3-6 and 6-10 year time of travel zones delineated for the well lie partially under the Ellisport Bay Sewer Board wastewater land application site. Highway 200 crosses the 6-10 year time of travel zone.

Table 1. Hope Elementary School Potential Contaminant Inventory

Map ID	SITE DESCRIPTION	POTENTIAL CONTAMINANTS[1]	TIME OF TRAVEL ZONE	SOURCE OF INFORMATION
1	Septic System Components	IOC, Microbial	0-3 year	Public Water System file
2	Wastewater Land Application Site	IOC, Microbial	3-6, 6-10 year	WLAP Database
3	Highway 200	IOC, SOC, VOC	6-10 year	Geologic Survey Map

[1] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Historic Water Quality

Water produced by the Hope Elementary School well is aggressive enough to leach copper from the school's plumbing in concentrations exceeding the action level. The school district installed corrosion control equipment in 1996 to deal with the problem. UV disinfection equipment was installed in 2000 in response to the detection of total coliform bacteria in distribution system samples taken in September 1998 and November and December 1999.

Chemical test results for Hope Elementary School are summarized on the table below. The volatile organic compound P-Dichlorobenzene detected in December 1998 is an ingredient in deodorants for garbage and restrooms. It is also used as an insecticide and fungicide on crops, and is a constituent of many petroleum products. P-Dichlorobenzene was not detected when the well was re-tested for volatile organic chemicals in March 2002.

Table 2. Hope Elementary School Test Results

Primary IOC Contaminants (Mandatory Tests)							
Contaminant	MCL (mg/l)	Results (mg/l)	Dates	Contaminant	MCL (mg/l)	Results (mg/l)	Dates
Antimony	0.006	ND*	10/24/95 - 3/13/02	Nitrate	10	0.8 to 2.9	11/22/93 to 3/13/02
Arsenic	0.01	ND	10/24/95 - 3/13/02	Nickel	N/A	ND	10/24/95 - 3/13/02
Barium	2.0	0.03	3/13/02	Selenium	0.05	ND	10/24/95 - 3/13/02
Beryllium	0.004	ND	10/24/95 - 3/13/02	Sodium	N/A	4.76 to 7.57	10/24/95 to 3/13/02
Cadmium	0.005	0.002	2/19/98	Thallium	0.002	0.001	0/24/95
Chromium	0.1	0.01	2/19/98	Cyanide	0.02	ND	10/24/95 - 3/13/02
Mercury	0.002	ND	10/24/95 - 3/13/02	Fluoride	4.0	ND	10/24/95 - 3/13/02

Secondary and Other IOC Contaminants (Optional Tests)			
Contaminant	Recommended Maximum (mg/l)	Results (mg/l)	Dates
Sulfate		19.4 to 22.3	10/24/95 to 3/13/02
Iron		0.07 to 11.8	December 1999
Magnesium		6.42	10/24/95

Regulated and Unregulated Synthetic Organic Chemicals		
Contaminant	Results	Dates
29 Regulated and 13 Unregulated Synthetic Organic Compounds	None Detected	10/19/93, 12/2/98, 3/13/02

Regulated and Unregulated Volatile Organic Chemicals		
Contaminant	Results	Dates
21 Regulated And 16 Unregulated Volatile Organic Compounds	None Detected except as noted below	8/3/93, 12/2/98, 3/13/02
P-Dichlorobenzene (MCL = 75.0 µg/l)	0.7 µg/l	12/2/98

*ND = None Detected

Final Susceptibility Ranking

The Hope Elementary School well ranked moderately susceptible to all classes of regulated contaminants. Detection of any amount of a man made chemical like P-Dichlorobenzene usually results in an automatic high susceptibility ranking relative to volatile organic chemicals. In this case, however, the amount detected was only 0.2 µg/l over the minimum detection level and far below the Maximum Contaminant Level. More over the chemical was not detected when the well was re-tested for volatile organic chemicals in 2002. Risk factors associated with local geology added the most points to the final susceptibility scores. Final scores and ranking relative to each class of contaminant are summarized on Table 3. The complete analysis worksheet for the well is in Attachment A.

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

The final ranking categories are as follows:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- > 13 High Susceptibility

Table 3. Summary of Hope Elementary School Susceptibility Evaluation

Final Susceptibility Scores/ Ranking				
	IOC	VOC	SOC	Microbial
Well	10/Moderate	9/Moderate	9/Moderate	10/Moderate

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
*HIGH - Indicates source automatically scored as high susceptibility due to presence of a VOC in the tested drinking water

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Operation and maintenance of the Hope Elementary School water system is mostly in compliance with *Idaho Rules for Public Drinking Water Systems*. Eliminating possible cross connections and venting the well properly should be the first priority for protecting the school's water quality. Because the well is located in a landscaped area, the maintenance staff should be reminded periodically to keep application of fertilizers, pesticides and herbicides a minimum of 50 feet from the well. When the nearby concrete walkway is hosed off, wash water should be directed away from the wellhead. Since the district is responsible for multiple facilities, it might be helpful to develop a written maintenance and testing schedule so important tasks don't get overlooked.

The school district should develop a drinking water emergency response plan for every water system it administers. There is a simple fill-in-the-blanks form available on the DEQ website to guide systems through the emergency planning process.

The school should also take advantage of the opportunity it has to teach its pupils about ground water stewardship. Program ideas and materials are readily obtainable on the Internet. There are numerous programs designed for adults as well that might be appealing family projects the parent association could promote in conjunction with school projects for the children. Home*A*Syst and Farm*A*Syst for example are voluntary programs that help people assess environmental risks on their property and find technical support for making needed changes.

Partnerships with neighboring landowners should be established. Some of them may not be aware that their property is in a sensitive area where household, agricultural or business practices could have a negative impact on water quality for the school. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

Assistance

Public water suppliers and users may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional DEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper of the Idaho Rural Water Association (208) 343-7001for assistance with drinking water protection strategies.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Division of Environmental Quality, 1994. Ground Water and Soils Reconnaissance of the Lower Payette Area, Payette County, Idaho. Ground Water Quality Technical Report No. 5. Idaho Division of Environmental Quality. December 1994.

Idaho Division of Environmental Quality, 1996. Lower Payette River Agriculture Irrigation Water Return Study and Ground Water Evaluation, Payette County, Idaho. Water Quality Status Report No. 115.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Natural Resource Conservation Service, 1991. Idaho Snake-Payette Rivers Hydrologic Unit Plan of Work. March 1991.

United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

University of Idaho. 1986. Ground Water Resources in a Portion of Payette County, Idaho. Idaho Water Resources Research Institute. University of Idaho. Moscow, Idaho. April 1986.

Attachment A

Hope Elementary School Susceptibility Analysis Worksheet

Ground Water Susceptibility

Public Water System Name : **HOPE ELEMENTARY SCHOOL** Source: **WELL #1**

Public Water System Number : **1090185** 5/15/02 3:48:25 PM

1. System Construction		SCORE			
Drill Date	7/29/87				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES 1998				
Well meets IDWR construction standards	YES	0			
Wellhead and surface seal maintained	NO	1			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		**4**			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	MODERATELY	1			
Vadose zone composed of gravel, fractured rock or unknown	NO	0			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		**4**			
		IOC	VOC	SOC	Microbial
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)		Score	Score	Score	Score
Land Use Zone 1A	SUBURBAN	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		**2**	**2**	**2**	**2**
Potential Contaminant / Land Use - ZONE 1B (3 YR. TOT)					
Contaminant sources present (Number of Sources)	YES	1	0	0	1
(Score = # Sources X 2) 8 Points Maximum		2	0	0	2
Sources of Class II or III leacheable contaminants or Microbials	YES	1	0	0	
4 Points Maximum		1	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		**3**	**0**	**0**	**2**
Potential Contaminant / Land Use - ZONE II (6 YR. TOT)					
Contaminant Sources Present	YES	2	0	0	
Sources of Class II or III leacheable contaminants or Microbials	YES	1	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		**3**	**0**	**0**	**0**
Potential Contaminant / Land Use - ZONE III (10 YR. TOT)					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of Zone	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		**1**	**1**	**1**	**0**
Cumulative Potential Contaminant / Land Use Score		**9**	**3**	**3**	**4**
4. Final Susceptibility Source Score		**10**	**9**	**9**	**10**
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

BML (Business Mailing List)– This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

Closed Or Open UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.